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THE MARSUPIUM OF THE UNIONIDÆ.

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In a recent preliminary announcement of a new system of classification of the Unionidæ which is based upon a study of the anatomy of the fresh-water mussels of Pennsylvania, Ortmann¹ suggests a division of the family (exclusive of the Hyriinæ) into four subfamilies, namely, Margaritaninæ, Unioninæ, Anodontinæ and Lampsilinæ, respectively. His arrangement lays especial emphasis on the characters of the marsupium and involves several important modifications of Simpson's classification, which he maintains must be recast to a considerable extent in order to make it represent the natural affinities of the group. Although it will not be possible to form an opinion in regard to the validity of the proposed changes before the appearance of his detailed results, he has undoubtedly fallen into a serious error with respect to the marsupium of one of his subfamilies, and it is the object of the present note to point out this mistake.

In connection with the fresh-water mussel investigations which have been under way in this laboratory for some time and which have been carried on for the United States Bureau of Fisheries, primarily for the purpose of determining the feasibility of artificial propagation of the Unionidæ, we have had occasion to give attention to the anatomical and histological structure of the marsupium in a large number of genera, and, furthermore, we have been particularly concerned with the changes that occur in the gills during the period of gravidity. Since a fundamental discrepancy exists between Ortmann's description of the gravid gill in his subfamily Anodontinæ and our own observations on at least three of the genera which he includes in this group, namely, *Alasmidonta*, *Anodonta* and *Symphynota*, we have thought it advisable to call attention to the fact.

Ortmann (p. 117) makes the following rather astonishing statement concerning the structure of the marsupium of the Anodon-

¹"A New System of the Unionidæ," A. E. Ortmann, *Nautilus*, XXIII, February, 1910, pp. 114-120.

tinæ: "Water-tubes in the gravid female *divided longitudinally into three tubes*, one lying toward each face of the gill, the third in the middle; only the latter contains eggs or embryos, and is much larger than the other tubes. This division into three parts is not present in the sterile (*sic*) female." Although it is not specifically stated, it is to be inferred from the above description that the divisions of the water-tubes into three parts is due to

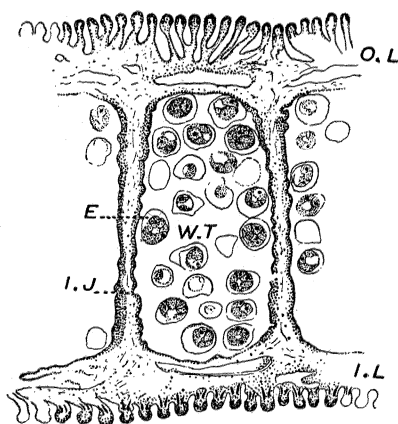


FIG. 1. *Anodonta cataracta* Say.—Horizontal section of portion of gravid marsupium, showing a water-tube, undivided and filled with embryos. O.L., outer lamella of gill; I.L., inner lamella; I.J., interlamellar junction; W.T., water tube; E, embryos, $\times 31.5$ Kline del.

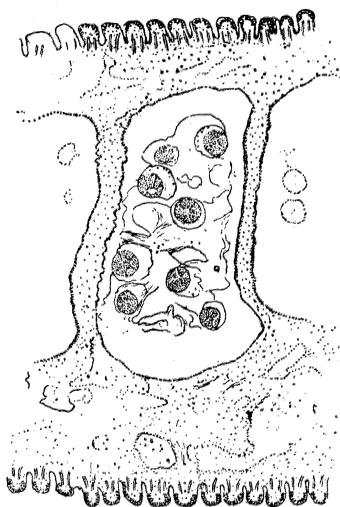


FIG. 2. *Alasmidonta truncata* Wright.—Horizontal section of portion of gravid marsupium, showing a water-tube, undivided and filled with embryos. The mass of embryos is somewhat contracted into the middle of the tube. $\times 31.5$ Kline del.

the presence of longitudinal partitions running parallel with the lamellæ, but no intimation is given as to how they arise, or how they disappear after the marsupium has discharged its contents. To any one familiar with the structure of the gills of the Unionidæ the statement that the water-tubes exhibit a temporary division into three parts is on its face improbable, for it would be difficult to imagine how such a division could be brought about, and still more difficult to understand why, when once established, it

should disappear after spawning. It is true that one occasionally encounters a partial fusion of two adjacent interlamellar junctions, with a consequent division into two or more parts of the water-tube lying between them, but this is not constant in occurrence for the species and, when it is present at all, it involves only a single tube here and there in the gill. We have observed such fusions in a few individuals belonging to different genera in both gravid and non-gravid gills, but it is a condition that must be regarded merely as an occasional variation and is entirely different from that which is supposed by Ortmann to exist in the *Anodontinæ*. His description, moreover, is at total variance with our observations in the three genera referred to, as sections of the gills in these forms, taken at various stages during the gravid period, show *absolutely no trace of such a division of the tubes*. In Figs. 1-3, which are drawn from horizontal sections of the gravid marsupium of *Anodonta cataracta* Say, *Alasmodonta truncata* Wright and *Symphynota complanata* Barnes, respectively, the water-tubes, containing embryos and glochidia, are seen in their usual form, undivided longitudinally and bounded by the inner and outer lamellæ of the gill and by the interlamellar junctions. If such a division of the tubes into three parts, as Ortmann describes, were present, it would of course be indicated in these sections.

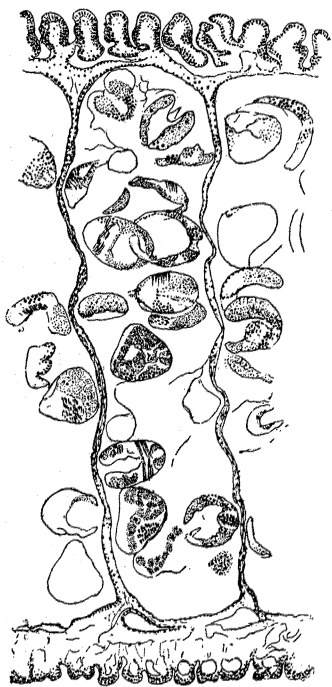


FIG. 3. *Symphynota complanata* Barnes.—Horizontal section of portion of gravid marsupium, showing a water-tube, undivided and filled with glochidia. $\times 31.5$ Kline del.

We are at a loss to understand what appearances observed by Ortmann could have given rise to his error. The only thing that suggests itself is that the material which he used had been

badly preserved and the gills in consequence much shrunken. In this event, it is quite possible that the embryos might have been contracted into a mass in the middle of the water-tube and the mucus, by which they are surrounded, coagulated in such a way as to cause the appearance of septa stretching between the interlamellar junctions when observed under a low magnification. It is not uncommon to find the embryos contracted in this manner to a greater or less degree as a result of fixation, as may be seen in Fig. 2, in which the mass of embryos has been withdrawn slightly from the inner surface of the lamellæ. The fact that he states that the divisions are only present in the gravid gills would lend some degree of plausibility to this explanation.

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